

Assignment 6

1.

Total number of cliques: 32

Largest clique:

- a. Cliqueld: CL_32
- b. Size: 6
- c. Executives: E3, E4, E6, E7, E11, E21

2.

- a. # clusters: 2
- b. Membership: With 2 clusters, only E38 is in one cluster, and everyone else is in the other

c.

	1	2
1	0.14864865	0.08108108
2	0.08108108	NaN

3.

B-D: $(3+3+3+2+2+1)/2 = 7$

C-D: $(3+3+3+2+2+1)/2 = 7$

E-D: $(4+4)/1 = 8$

The edge with the greatest betweenness is E-D.

4.

Membership:

\$`1`

[1] "E1" "E8" "E9" "E10" "E13" "E16" "E20" "E24" "E25" "E26" "E29" "E31" "E32" "E34" "E35" "E38"

\$`2`

[1] "E2" "E3" "E4" "E6" "E7" "E11" "E14" "E15" "E19" "E21" "E22" "E27" "E28"

\$`3`

[1] "E5" "E12" "E23" "E30" "E33" "E36" "E37"

\$`4`

[1] "E17" "E18"

Modularity: 0.48

Density:

	1	2	3	4
1	0.28333333	0.03365385	0.03571429	0.03125
2	0.03365385	0.51282051	0.03296703	0.00000
3	0.03571429	0.03296703	0.57142857	0.00000
4	0.03125000	0.00000000	0.00000000	1.00000

5.

We see that for office, cluster 4 is only in office 1 while clusters one and two are more scattered. For projects, people in cluster 3 have completed more projects on average. For seniority, cluster 1 has the highest number of senior people while cluster 3 has the highest percentage of senior people.

```
> table(GirvanNewman[, "CL_4"], attributes$office)

 1 2 3
1 4 9 3
2 5 5 3
3 4 3 0
4 2 0 0
> table(GirvanNewman[, "CL_4"], attributes$projects)

 0 1 2 4 5 6 7 8 9 12 13 14 15 16 17 18 19 27
1 0 0 0 3 2 1 2 1 2 0 0 1 0 1 1 0 1 1
2 5 4 2 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0
3 0 0 0 0 0 1 0 0 0 1 1 1 1 0 0 1 1 0
4 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
> table(GirvanNewman[, "CL_4"], attributes$seniority)

 0 1
1 4 12
2 12 1
3 1 6
4 1 1
```

```
> tapply(X = attributes$office, INDEX = GirvanNewman[, "CL_4"], FUN = mean)
      1      2      3      4
1.937500 1.846154 1.428571 1.000000
> tapply(X = attributes$projects, INDEX = GirvanNewman[, "CL_4"], FUN = mean)
      1      2      3      4
10.062500 1.461538 13.857143 3.000000
> tapply(X = attributes$seniority, INDEX = GirvanNewman[, "CL_4"], FUN = mean)
      1      2      3      4
0.75000000 0.07692308 0.85714286 0.50000000
```